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Colorado Department
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Influenza Surveillance Summary Colorado 2008-2009

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http://www.cdphe.state.co.us/dc/Influenza/SummaryInfluenzaSeason08-09.pdf

Summary

For surveillance purposes, the 2008-2009 influenza season was from the week ending October 4, 2008 through the week ending May 2, 2009. The 2009 H1N1 virus appeared in late April 2009 and will be reported in the 2009-2010 Influenza Surveillance Summary. Influenza activity in Colorado during the 2008-2009 season was milder than the 2007-2008 season. Based on surveillance of influenza-associated hospitalizations and influenza-like illness (ILI) reported by Kaiser Permanente Colorado, the season peaked in late February. The predominant strains during the 2008-2009 influenza season were type A/H1N1 (seasonal) and type A/H3N2, with seasonal H1N1 being the more prevalent of the two.

In contrast with the more typical "U-shaped" distribution of influenza-associated hospitalization rates by age group, the 2008-09 season exhibited more of a "J-shaped" distribution with higher rates in infants and young children, but blunted rates in the elderly. There were 7 reported pediatric deaths and the number of outbreaks reported from long-term care facilities was less than previous year.

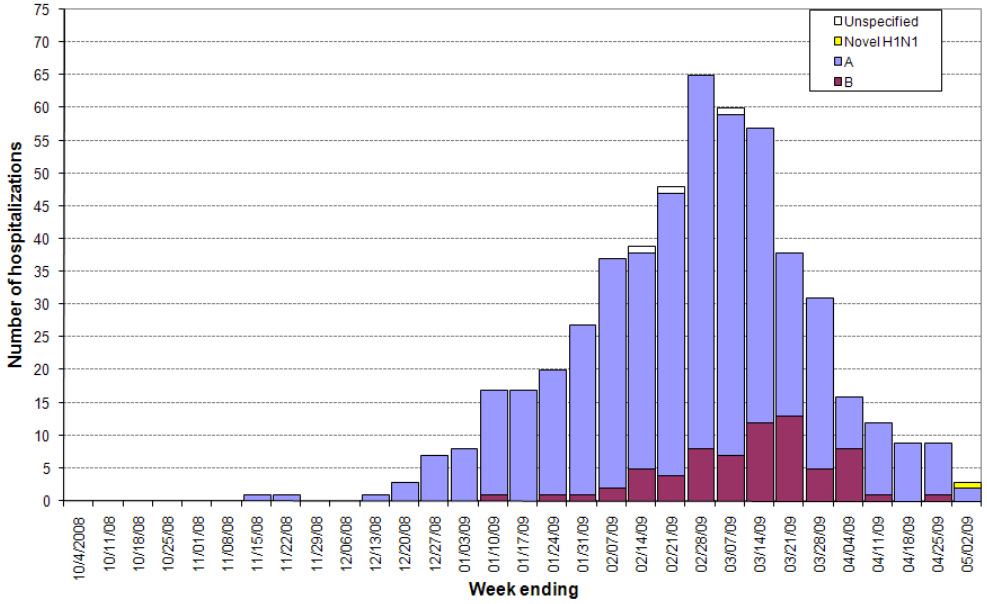
Components of Colorado's Influenza Surveillance

Influenza surveillance in Colorado during the 2008-2009 season was based on the following components: reports of influenza-associated hospitalizations, influenza-like illness (ILI) reported by Kaiser Permanente Colorado (for the Denver metropolitan area), numbers and percent positive influenza lab tests reported by sentinel laboratories, circulating strain surveillance (based on PCR testing at the CDPHE laboratory), influenza-associated pediatric deaths and reports of influenza outbreaks in long-term care facilities (LTCF).

Influenza-Associated Hospitalizations

A total of 530 hospitalizations from 32 counties was reported from the week ending October 4, 2008 through the week ending May 2, 2009. Influenza activity remained low until January 2009 and peaked during the week ending February 28. Whereas, type A virus associated-hospitalization reports peaked during the week ending February 28, 2009, type B virus-associated hospitalizations peaked approximately 2-3 weeks later. Type B virus-associated hospitalizations only accounted for 6% of all reported hospitalizations (Figure 1).

Figure 1. Number of Reported Influenza-Associated Hospitalizations by Week of Diagnosis, Colorado, 2008-2009 Influenza Season



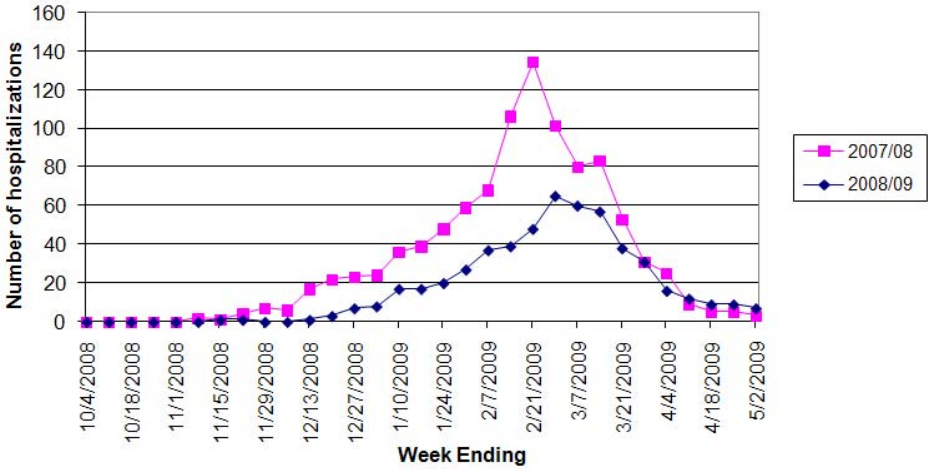
In contrast to the 530 influenza-associated hospitalizations reported for the 2008-2009 season, there were 1004 reported influenza-associated hospitalizations during the 2007-2008 season (Table 1, Figure 2).

Table 1. Number of Reported Influenza-Associated Hospitalizations Colorado, 2004-05 to 2008-2009 Influenza Seasons

Flu Season	Hospitalizations
2004-2005	980
2005-2006	848
2006-2007	364
2007-2008	1004
2008-2009	530*

Regular flu season surveillance is October-May
** 2008-09 Season ended May 2, 2009, 4 weeks earlier than normal due to appearance of 2009 H1N1 virus.*

Figure 2. Number of Reported Influenza-Associated Hospitalizations by Week of Diagnosis Colorado, 2007-08 and 2008-2009 Influenza Seasons



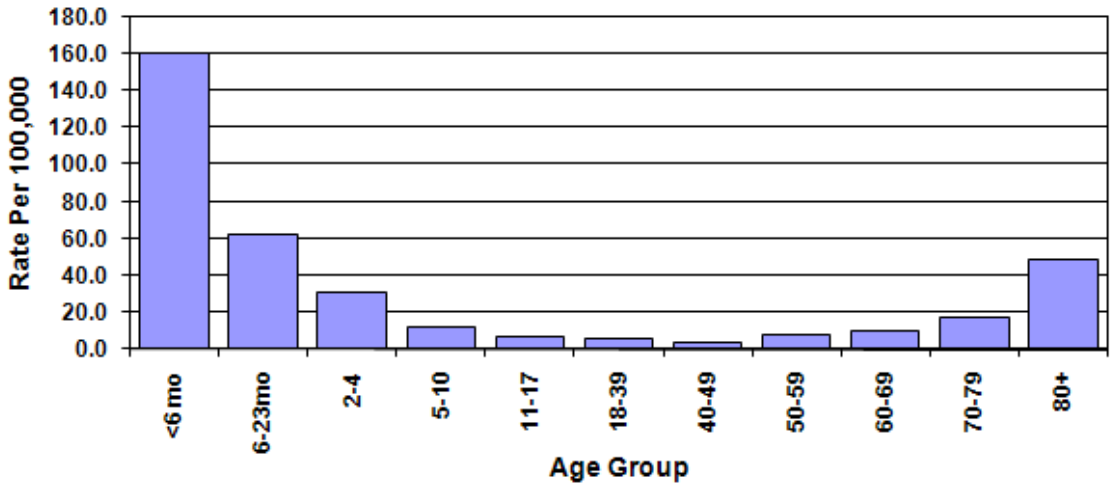
Children less than 6 months of age had the highest influenza-associated hospitalization rate at 159.8 per 100,000 population (Table 2, Figure 3), followed by children 6-23 months of age and persons 80 years of age and older. Reported rates of hospitalization among persons 80 years of age and above were much lower relative to children less than 6 months of age than has been seen during past "more active" flu seasons. (e.g., 2007-08, 2005-06, 2004-05). This resulted in more of a "J-shaped" age distribution of rates than the classic "U-shaped" distribution normally seen. It is worth noting that reported rates of influenza-associated hospitalizations are especially likely to under-represent true rates of influenza-associated hospitalizations among older persons since such persons are probably less likely to be tested for influenza and rapid flu tests have been demonstrated to be less sensitive in adults than in children.

Table 2. Influenza-Associated Hospitalizations by Age Group Colorado, 2008-2009 Influenza Season

Age	No.	%	CO pop dist	Rate per 100,000
<6 mo	56	10.6	35051	159.8
6-23mo	65	12.3	105918	61.4
2-4	66	12.5	214276	30.8
5-10	45	8.5	403736	11.1
11-17	30	5.7	464978	6.5
18-39	75	14.2	1565563	4.8
40-49	20	3.8	756830	2.6
50-59	46	7.1	667847	6.9
60-69	33	6.2	356646	9.3
70-79	37	7.0	220329	16.8
80+	57	10.8	118605	48.1

Total	530	100	4909779	10.8

Figure 3. Influenza-Associated Hospitalization Rates by Age Group
Colorado, 2008-2009 Influenza Season



Influenza-Like Illness (ILI) Surveillance

The percent of medical office visits for ILI is thought to be a valid measure of influenza activity in the community. Kaiser Permanente Colorado in the Denver-Boulder area was the ILI sentinel provider for the 2008-2009 flu season. Kaiser reports influenza-like illness based on ICD-9 codes (i.e. diagnostic codes) from their electronic medical records database. The percentages shown in Figure 4 are based on the numbers of primary care office visits assigned a diagnosis consistent with influenza-like illness divided by the total numbers of primary care clinic visits for the week. These reports indicate that influenza activity in the Denver-Boulder community during the 2008-2009 influenza season began to increase during the week ending January 24, 2009 and returned to baseline levels during the week ending April 4, 2009. The peak percent of ILI occurred over a 3 week period during the weeks ending 2/14, 2/21, and 2/28. The magnitude of the peak percent ILI (2.1%-2.2%) was lower than during the 2007-08 flu season (3.5%). A sharp rise in the percent ILI is evident for the week ending May 2, 2009 which was the week following the announcement of the appearance of pandemic 2009 H1N1 virus.

The age distribution of ILI clinic visits is shown is Figure 5. The 5 to 24 year old age group had the highest ILI percent followed by the 0 to 4 year olds.

Figure 4. Percentage of Clinic Visits for Influenza-Like Illness (ILI) by Week Reported by Kaiser Permanente Colorado Colorado, 2008-2009 Influenza Season

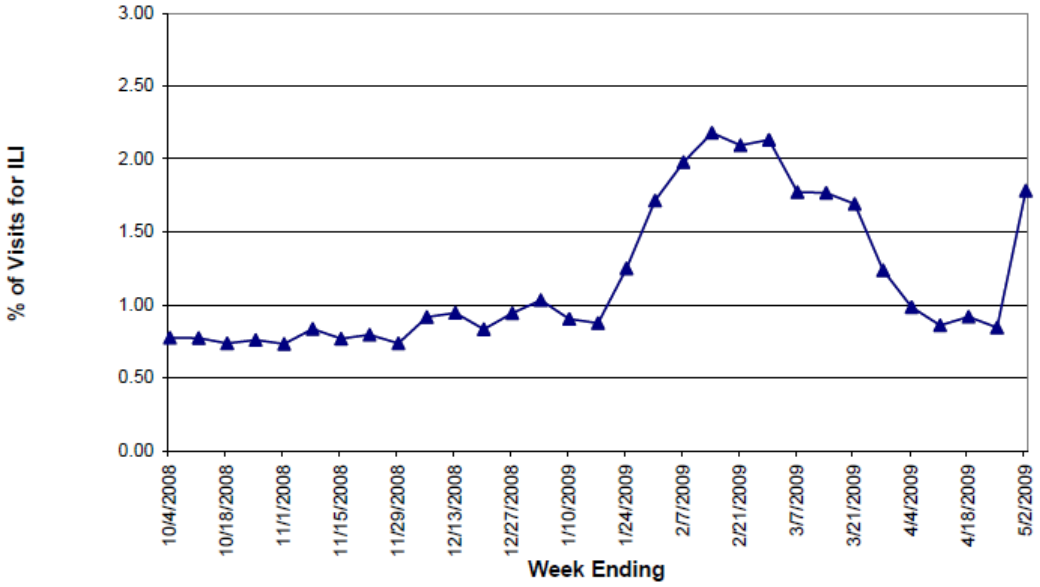
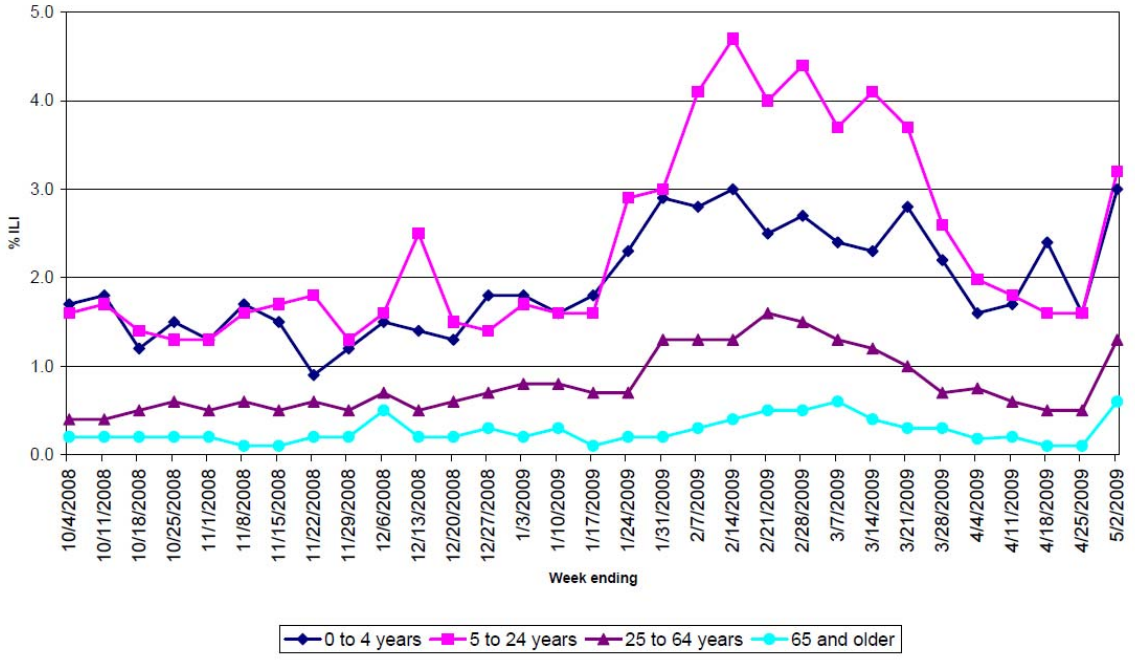


Figure 5. Percentage of Patients Seen Weekly with Diagnosis of Influenza-Like Illness (ILI) Kaiser-Permanente Aggregate Data by Age Colorado, 2008-2009 Influenza Season



Laboratory Surveillance

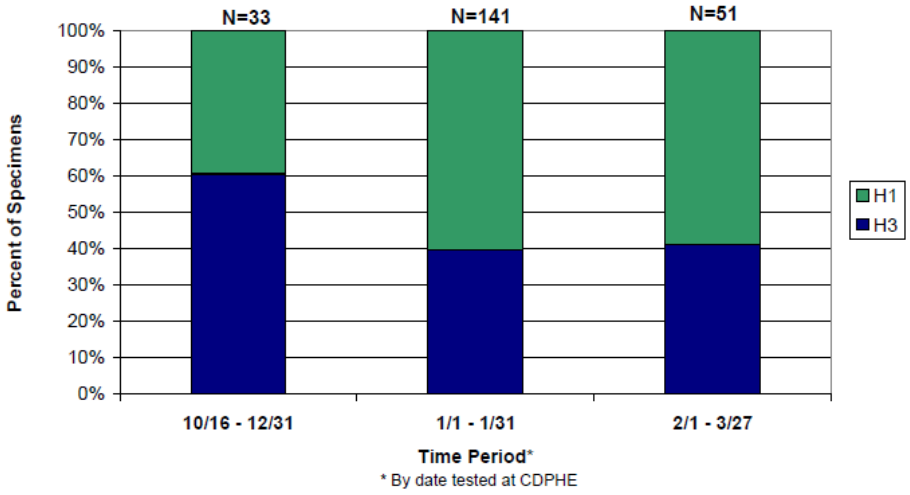
Circulating Strain Surveillance

An important component of influenza surveillance consists of the typing and subtying of influenza viruses throughout the season to determine the circulating strain(s) of virus. Hospital laboratories around the state submit clinical specimens to the state laboratory where influenza virus typing and subtyping are performed by use of polymerase chain reaction (PCR) testing. Some of these specimens are then sent to CDC for further antigenic characterization (assessment of match to the vaccine strains). Of the specimens submitted to the Colorado Department of Public Health Laboratory, 283 were positive for type A or B viruses. Of those positive for type A viruses, 57% were seasonal H1N1 virus and 43% were seasonal H3N2 virus. Interestingly, subtype H3N2 was identified more frequently early in the season, whereas, H1N1 became more predominant by the peak part of the season (Table 3, Figure 6).

Table 3. CDPHE Laboratory Influenza Type and Subtyping Results, Colorado, 2008-2009 Influenza Season

	Cumulative (9/28/08 – 05/02/09)
Total Positive for A	266 (94%)
Subtypeable	225
H3	97 (43%)
H1	128 (57%)
Non-subtypeable	41
Subtype pending	0
Total Positive for B	17 (6%)
TOTAL	283

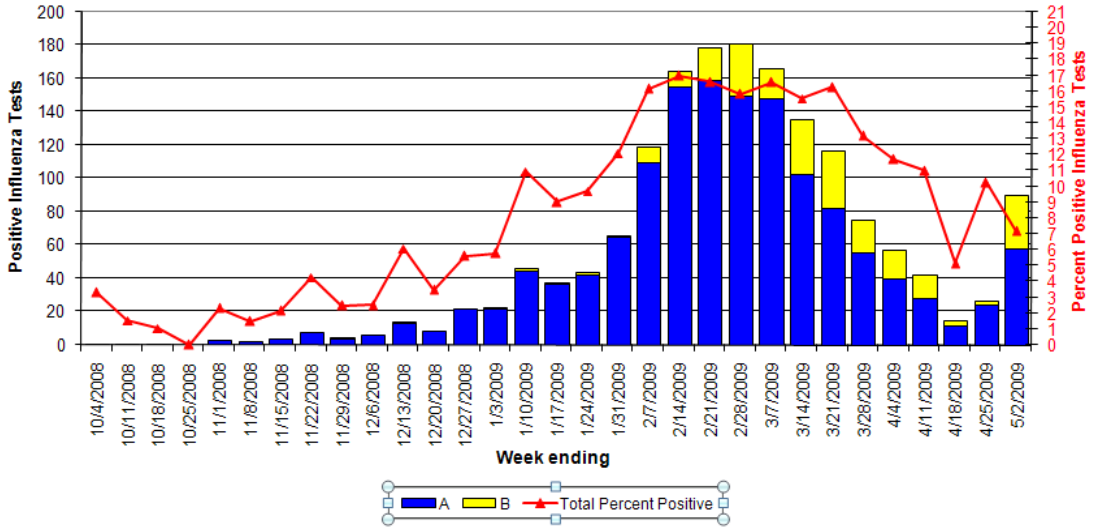
Figure 6. Distribution of Influenza A Virus Subtypes Colorado, 2008-2009 Influenza Season



Sentinel Laboratory Reporting

Sixteen sentinel laboratories around the state submitted reports of the numbers of influenza tests performed, the numbers of positive tests and the percent of positive tests each week during the 2008-2009 influenza season. The total number of respiratory specimens that tested positive for influenza at 16 sentinel labs peaked during 2 weeks in late February. The percent positivity (red line in graph below) peaked and stabilized for seven weeks, from the week ending February 7, 2009 to the week ending March 21, 2009, before declining (Figure 7).

Figure 7. Sentinel Lab Influenza Testing by Week
Colorado, 2008-2009 Influenza Season



Pediatric Deaths

Since the 2003-2004 influenza season, CDPHE has conducted surveillance for pediatric deaths due to influenza. Pediatric influenza-associated deaths become a "reportable disease" during the 2004-05 season. During the 2007-2008 influenza season, there were seven pediatric deaths reported, which was substantially greater than the previous four seasons (Table 4.). Given the relative mildness of the 2008-09 flu season as measured by the other surveillance indicators in this report, this number of pediatric influenza-associated deaths was unexpected.

Table 4. Influenza-Associated Pediatric Deaths
Colorado, 2003-04 to 2008-09 Influenza Seasons

Flu Season	Deaths
2003-04	12
2004-05	2
2005-06	2
2006-07	1
2007-08	2
2008-09	7*

*Includes death reported in 08-09 season but after defined season dates which may have been acquired on domestic and/or international travel.

Long-Term Care Facilities (LTCF) Influenza Outbreaks

Long-term care facilities (LTCF) are requested to report outbreaks of influenza or ILI. The number of outbreaks reported during the 2008-2009 season was considerably lower (n=9) than the 2007-2008 season (n=48), but comparable to the mild 2006-2007 season (n=15).